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ABSTRACT

This study examined the effectiveness of the anchored instruction (i.e., using a theme or anchor around which various learning activities take place) approach in preparing preservice teachers to integrate technology. Participants were 48 students enrolled in the three sections of a preservice educational technology class during the summer of 1997. The instructor began by explaining the basic concepts of anchored instruction to the class and then employed the principles of anchored instruction in teaching the class for its entire six-week duration. "Oregon Trail," a popular computer simulation program, was selected as the anchor for the course. During the last session, students were given a 15-item Likert questionnaire that addressed the following questions: (1) "Will students feel that they learned basic technology skills?" (2) "Will students understand why the instructor used an anchored instruction approach?" (3) "Will students feel that they could apply anchored instruction as a technique for technology integration in their own teaching?" and (4) "Will students enjoy participating in the class?" Results indicated that students responded positively to this approach and learned essential technology skills in the process. (AEF)

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ED 421 116

Anchored Instruction in Preservice Educational Technology Classes: A Research Project

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Many professional teacher education programs require students to take courses that prepare them to integrate the use of various technologies in their daily teaching activities. One approach to the design of such courses involves using a theme or anchor around which various learning activities take place. This approach has been referred to as "anchored instruction" (Bransford, Sherwood, Hasselbring, Kinzer, & Williams, 1990).

While researchers have claimed that anchored instruction is an effective approach in preparing preservice teachers to integrate technology (Bauer, Ellefsen & Hall, 1994; Bauer & Summerville, 1996), very little empirical data exist to support these claims. In this study, the researcher designed, tested, and employed an instrument in order to answer the following research questions:

After participating in a preservice educational technology course based on principles of anchored instruction:

1. will students feel that they learned basic technology skills?
2. will students understand why the instructor used an anchored instruction approach?
3. will students feel that they can apply anchored instruction as a technique for technology integration in their own teaching?
4. will students have enjoyed participating in the class?

Forty-eight students enrolled in three sections of a one-semester-hour preservice educational technology class during the summer, 1997, participated in this study. Table 1 summarizes the characteristics of the subjects involved in the study.

Limitations of the Study

The reader is cautioned that there are three limitations to this study that may threaten its generalizability. First, the researcher also acted as the instructor for these preservice educational technology classes. This individual has had nearly twenty years of classroom experience and has won awards for excellence in teaching. It is possible that other approaches could have yielded similar results in terms of student satisfaction.

Second, this study utilized intact groups with a single treatment-posttest design. No control group was used, and there were no attempts to randomly select subjects for this study.

Finally, at the time of the writing of this article, internal reliability statistics have not been calculated for the instrument used. Also, a significant amount of qualitative data including field notes and open-ended responses designed to triangulate the Likert questionnaire was collected. Analysis of this data is ongoing.

Using MECC's Oregon Trail as an Anchor

The instructor began by explaining the basic concepts of anchored instruction to the class, and then employed the principles of anchored instruction in teaching the class for its entire six-week duration. During the last session, students were given a fifteen-item questionnaire that focused on the four research questions mentioned previously.

Oregon Trail, MECC's popular computer simulation program, was selected as the anchor for the course. This program fit the requirements of a good anchor by providing a rich learning environment upon which many learning activities could be built (McLarty, Goodman, Risko, Kinzer, Vye, Rowe, & Carson, 1990). All of the activities involved the integration of appropriate technologies, including word processing, spreadsheets, presentation software, drawing and painting programs, hypermedia, Worldwide Web exploration, and audio/video processing.

The researcher borrowed five key decision points for using anchored instruction from McLarty et al., (1990) and added one additional item. They were as follows:

- Choosing an appropriate anchor (McLarty et al., 1990)
- Developing shared expertise around the anchor (McLarty et. al., 1990)
- Expanding the anchor (McLarty et al., 1990)
- Teaching with the anchor (McLarty et al., 1990)
- Allowing student exploration (McLarty et al., 1990)
- Sharing what was learned from the anchored instruction (Bauer, Ellefsen & Hall, 1994)

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Figure 1. Oregon Trail II Simulation Software.

Students first explored MECC's *Oregon Trail* simulation program in order to develop a shared expertise around the anchor. They collected data as they ran through the simulation and organized it using a spreadsheet program. The resulting product looked like the sample shown in Figure 2.

This activity accomplished at least two objectives. First, students learned how to collect and organize data electronically. Second, students learned basic spreadsheet operations such as data entry and creating formulas to automatically calculate values (miles traveled between landmarks, miles traveled per day, etc.). Students then formulated and tested hypotheses based on the data that they collected. For example, they hypothesized that the number of miles traveled per day would decrease as the wagon train crossed the mountainous regions of Wyoming, and that travel would be slower during rainy or snowy months than it would be during dry months. Again, students used the data that they collected to affirm or contradict their hypotheses.

Another type of data that is easily accessible is the trail log or diary (depending on which version of the *Oregon Trail* software is used). Both the trail log and the diary keep track of daily events during the simulation. Students exported these files to a word processor and used them as a basis for a creative writing activity where they wrote fictional letters home from the trail. Students were encouraged to embellish the details of their vicarious adventures along the Oregon Trail.

The next activity involved exploring the Worldwide Web to see what information students could find related to the Oregon Trail. This activity was designed to follow McClarty et al.'s third and fifth key decision points—expanding the anchor and allowing student exploration. Students were organized into small groups. Each group selected a site along the Oregon Trail to explore. Several excellent Worldwide Web sites were identified including the following:

- http://pbs.org/opb/oregontrail (This website includes sections on facts, myths, and trivia along with a teacher's guide for using the PBS video series)
- http://www.nationalparks.org/guide/parks/fort-laramie-1986.htm (National Park Foundation's Fort Laramie site)
- http://www.teleport.com/~eotic/stories ("The Road to Oregon: Articles About the Oregon Trail")
- http://www.isu.edu/~trinmich/facts.html (Idaho State University's "Fantastic Facts About the Oregon Trail")
- http://www.ukans.edu/kansas/seneca/oregon/mainpage.html (University of Kansas' "Oregon Trail: The Trail West")
- http://www.ohwy.com/or/o/oregontr.htm (Oregon Online Highways)
- http://www.mecc.com/ies/oto/oto.html (MECC's online version of the Oregon Trail computer simulation)

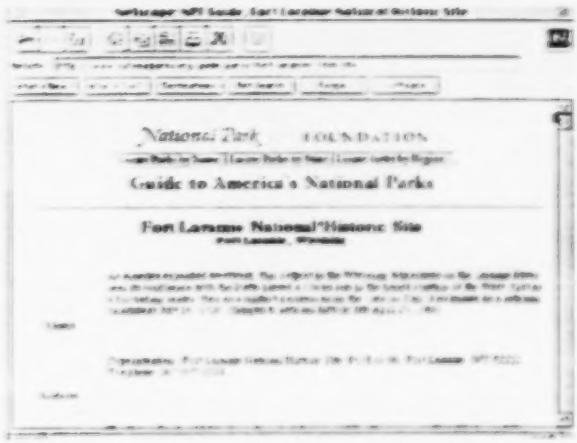

Figure 3. National Park Foundation's Fort Laramie Worldwide Web Site.

Once the information was gathered and processed, Powerpoint presentations were developed. These presentations included scanned pictures, images downloaded from the Worldwide Web, Quicktime movies, and text. Students used a computer projector to share their projects.

Students expanded the anchor even further by developing individual Oregon Trail Hyperstudio stacks related to their areas of interest or academic major. One earth sciences student, for example, developed a stack that explored various geomorphic features along the trail. A music major developed a stack that explored composers of the 1840's.

Anchored Instruction Questionnaire: Summary of the Data

At the conclusion of the course, students completed a fifteen-item Likert questionnaire in order to answer the research questions. There were between three and five items

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Table 1.
Demographic Characteristics of Participants.

Majors		Ages	Rank		Grade Level Preferred		Gender	
Biology	2	Median	Freshman	0	Preschool	1	Male	12
Business	1	=23	Sophomore	7	K-2	18	Female	34
Earth Sciences	1		Junior	20	3rd - 5th	16	Not reported	2
Education	2	Mean	Senior	10	6th -8th	7		
English	10	= 23	Graduate	9	9th - 12th	18		
History	1		Not reported	2	Other	1		
International Studies	1	Range			N/A	1		
Math	2	19-44						
Music Education	1				(some students			
Physical Education	1	Mode			listed more			
Social Sciences	9	= 20			than one			
Sociology	1				preference)			
Spanish	1							
Special Education	7							
Speech Communications	5							
Theater	1							
Not reported	2							
Total	48			48				48

Date	Landmark	Total # miles	Pace	# People	Miles/ landmark	Days	Miles/Day
4/1/48	Independence	0	Steady	5	0	0	0
4/8	Kansas R.	102	Steady	5	102	7	14.6
4/13	Big Blue R.	185	Steady	2	83	5	16.6

Figure 2. Sample of Oregon Trail Spreadsheet Activity.

for each of the four research questions. The data summarized below include (a) the research questions, (b) the individual items from the questionnaire related to each research question (not in the same order in which they appeared on the original questionnaire), and (c) tables containing percentage data for each item from the questionnaire.

Research Question 1. Will students feel that they learned basic technology skills?

Item 1. I am satisfied with the amount of information that I learned in this class

Item 2. I learned very little about educational technology in this class.

Item 3. I learned alot about educational technology in this class.

Item 4. The projects in this class were a waste of time.

Research Question 2. Will students understand why the instructor used an anchored instruction approach?

Item 5. I understand why the instructor used the Oregon Trail simulation as a theme or anchor for this class.

Item 6. I have no idea what anchored instruction is.

Item 7. The instructor should continue to use anchored instruction as a basis for teaching this class.

Research Question 3. Will students feel that they can apply Anchored instruction as a technique for technology integration in their own teaching?

Item 8. Using the Oregon Trail simulation as the anchor in this class helped me understand how to integrate technology into my own teaching.

Item 9. I understand how I can use Anchored instruction in my own teaching.

Item 10. Using the Oregon Trail simulation as the anchor in this class confused me about how to integrate technology into my own teaching.

Research Question 4. Will students enjoy participating in the class?

Item 11. I looked forward to coming to this class.

Item 12. I dreaded coming to this class.

Item 13. I enjoyed using the Oregon Trail simulation as a basis for the projects in this class.

Item 14. I would have preferred another approach - rather than anchored instruction - in this class.

Item 15. Using the Oregon Trail simulation as a basis for the projects in this class was a bad idea.

Table 2.
Data Summary for Item 1.

	SA	A	N	D	SD
Item 1	56%	33%	2%	6%	2%
Item 2	0	2	2	27	69
Item 3	60	35	2	2	0
Item 4	0	0	2	35	63
Item 5	77	21	2	0	0
Item 6	0	4	6	19	71
Item 7	73	17	10	0	0
Item 8	65	33	0	2	0
Item 9	58	35	4	2	0
Item 10	0	0	4	31	65
Item 11	50	33	15	2	0
Item 12	0	0	6	25	69
Item 13	54	44	2	0	0
Item 14	0	4	6	42	48
Item 15	0	0	2	23	75

SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree. All numbers in tables are percentages. N = 48

Discussion and Conclusions

The data indicate that the anchored instruction approach worked well for the preservice educational technology course. Students reported:

- they did learn technology skills that they could use in their teaching;
- they understood why the instructor used anchored instruction;
- they could apply the approach in order to integrate technology into their own teaching; and
- they enjoyed participating in the class.

Technology integration is an important skill for preservice teachers to develop if they are to be innovative and successful professional educators. It is a topic that is discussed in most preservice educational technology courses and in textbooks. Rarely, however, do instructors model technology integration using techniques that preservice teachers can easily apply in their own teaching. Anchored instruction is one model that can be used to show preservice teachers how to integrate appropriate technologies in their teaching regardless of the grade level or content area. The data presented in this study clearly indicate that students responded positively to this approach and learned essential technology skills in the process. There are, perhaps, other models and approaches that my be as effective in preparing the current generation of teacher candidates. Individuals in charge of preservice teacher technology preparation should actively seek out these models and approaches and conduct further research to determine their effectiveness.

For an update to this article, plus other information related to anchored instruction in preservice educational technology courses, check the following URL: http://

www.edtech.unco.edu/Professors/BauerWebsite/Bauer.HTM

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